

SAVING RESOURCES AND OPTIMAL USE OF RAW MATERIALS

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USE OF LOCAL RAW MATERIALS

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The Krasnyi Luch Glass Factory (Pskov Region) is one of the oldest glass factories in the North-West of Russia. It produces a wide range of illumination and signal glass fittings for railways and automobiles. This production is characterized by a wide range of glass compositions and small production lots.

Various types of glass are produced at the factory using materials brought from other regions: nonmetalliferous batch components, quartz sand, feldspar, dolomite, and limestone.

In recent years the production costs at the factory significantly increased due to the increased cost of materials, fuel,

and freight expenses, whereas the demand for the products decreased. In order to maintain the profitability of the business, the company had to pay low wages and cancel the programs for introduction of new equipment and technologies.

In order to increase profitability and to create new working places in the framework of the industrial revival regional program, the management of the glass factory together with

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TABLE 1

Batch components	Currently used materials			Recommended materials			Saving, rub
	Price of material, rub	Freight costs, rub	Plant expenses, rub	Price of material, rub	Freight costs, rub	Plant expenses, rub	
<i>Quartz-containing material</i>							
Quartz sand, Ramenskii Mining and Concentration Works, Moscow Region	1970.4	202.95 (350 km)	Standing expenses	—	—	—	—
Quartz sand, Velikoretskoe deposit or Strugi Krasnye deposit (Pskov Region)	—	—	—	863.64	84.72 (100 km)	1199.5	25.49
<i>Carbonate material</i>							
Dolomite, Melekhovo-Fedotovskoe deposit (Vladimir Region)	288.11	16.95 (480 km)	318.0	—	—	—	—
Limestone, Mar'ino-Leshutinskoe deposit (Vologda Region) or Porkhovskoe deposit (Pskov Region)	—	—	—	579.6	22.26 (150 km)	Standing expenses	94.09
<i>Alumina-containing material</i>							
Feldspar, Vishnevogorskoe deposit (Chelyabinsk Region)	1141.2	229.51 (2060 km)	95.1	—	—	—	1465.81
<i>Alkali-containing material</i>							
Soda (Sterlitamak, Bashkiria)	4914.0	405.13 (1800 km)	Standing expenses	—	—	—	—
Soda (Pikalevo, Leningrad Region)	—	—	—	4628.4	79.34	Standing expenses	611.39
Sodium sulfate (Volgodonsk, Volgograd Region)	82.5	6.80 (1500 km)	Standing expenses	82.5	6.8 (1500 km)	The same	0
Total	—	—	—	—	—	—	2196.78

the investors and the District Administration adopted a decision to develop a new integrated program for production of brown glass bottles for beer and other liquids.

The problem of the raw materials for current and future products was thoroughly investigated in the context of this program. The program anticipates the organization of a new production division for batch composition and a division for the preparation of quartz material with the aim of using local raw materials as far as possible and reducing the number of batch components. The regional database of nonmetallic materials whose resources are approved as molding and other construction materials was used to select the new material sources.

As a consequence of the analysis of the physicochemical parameters of the raw materials and cost-efficiency calculations for the particular glass composition, two quartz sand deposits (*Velikoretskoe* and *Strugi Krasnye* located in the Pskov Region) were selected as the most expedient sources of quartz material, and the limestone from the *Mar'ino-Leshutinskoe* deposit (Vologda Region) and *Porkhovskoe* deposit (Pskov Region) was chosen as sources of carbonate material.

The use of local raw materials in the composition of batch for brown glass bottles will make it possible to significantly decrease the production cost and eliminate the use of the aluminum-bearing component which is currently introduced into the batch, namely, feldspar from the *Vishnevogorskoe* deposit.

Table 1 presents the expected decrease in the cost of the batch as a consequence of conversion of the *Krasnyi Luch* Factory to local raw materials. The calculation is based on the daily consumption of the batch components and the cost of railway transport of 1 ton of material per 1 km equal to 2.47 rub, inclusive of VAT. The railway company charges for freight handling and other services were not taken into account. The plant expenses related to the preparation and treatment of materials in the batch mixing division were calculated only for the components suggested for replacement, and the cost of preparation and treatment of other batch components was accounted as standing expenses.

It can be seen from Table 1 that substitution of the recommended local raw materials for the currently used materials in the newly organized production of brown glass bottles will make it possible to decrease the cost of daily batch consumption by 2197 rub, including 4 times lower cost of transport services.